Original Article

DOI: 10.7860/JCDR/2024/66246.19406

Dentistry Section

Comparison of Periodontal Status between Koraga Tribes and Malavettuvan Tribes in Kasargod District of Kerala: A Cross-sectional Study

POOJA RAGHU[1], SHRINIDHI M SHANKAR[2], SOUMYA B GURURAJ[3], CHETHANA K CHIDAMBAR[4], KALA S BUSHAN[5], CHAITRA M PRABHUDEV[6]

ABSTRACT

Introduction: The lack of a healthcare system is one of the serious problems among the Koragas. The Koraga tribal community in the Kasargod district has a community health center in the area, but it lacks advanced medical and dental facilities, making it difficult for them to seek treatment in the few private hospitals in the area due to their economic backwardness. The Malavettuvan tribes are distributed only in the ghat areas of the Kasaragod District of Kerala. Their major occupation is agriculture, and they are educationally, economically, and socially backward.

Aim: To compare the periodontal status of the Koraga and Malavettuvan tribes of the Kasargod district.

Materials and Methods: This cross-sectional study was conducted among randomly selected 304 participants from both Koraga and Malavettuvan tribes aged 35-55 years. Clinical parameters such as the oral hygiene index, Community Periodontal Index (CPI), and loss of attachment were measured. A questionnaire was used to assess the oral hygiene habits, lifestyle, and other habits of the populations. Statistical analysis was carried out using the Mann-Whitney U-test.

Results: The results of the present study showed a significant difference in the oral hygiene index (Median OHI of Koraga-0.40, Malavettuvan-1.20 respectively, p-value <0.001) and CPI (Median CPI of Koraga-0.60, Malavettuvan-1.50, respectively, p-value <0.001) between both groups, while there was no difference in the loss of attachment (p-value-0.991). The majority of the Koragas and Malavettuvans used toothbrush and toothpaste as cleaning aids (70.06% and 78.28%, respectively). Smokeless tobacco was prevalent among Koragas compared to Malavettuvans (36.18% and 29.60%, respectively), while cigarette smoking was more common among Malavettuvans (50.98% and 42.10% for Koragas and Malavettuvans, respectively).

Conclusion: Even though the Koragas and Malavettuvans do not routinely seek dental care and have a primitive lifestyle with less formal education, a lower level of periodontal disease was observed among both groups. There is a need to promote more healthcare programs that emphasise oral health among these populations.

Keywords: Community periodontal status, Dental care, Habits, Oral hygiene status, Periodontal diseases

INTRODUCTION

India represents a vast land of diversity with its unique and intriguing culture, traditions, and beliefs. Despite rapid advancements in the fields of diagnostics and medicine, a more obscure picture of the 'Tribes', who represent the nation's true indigenous colour, can be noticed. According to the census of scheduled tribes in 2011, the population of scheduled tribes constitutes 9.01% of the total population of India [1]. Tribes are indigenous populations who live in isolated areas away from contemporary trends and economic developments of the land, holding onto their traditional values and customs [2].

Most of the scheduled tribal population is suffering from malnutrition and infectious diseases, often referred to as 'diseases of the poor' [3]. Micronutrient malnutrition such as anaemia and iodine deficiency disorders are major health issues among the scheduled tribes [2]. Studies have reported rising incidents of malaria and tuberculosis in the forest tribes; hence, they require special medical care due to their difficult terrain and isolation [4]. Poverty, illiteracy, harsh living environments, high rates of beedi smoking, alcohol use, and poor access to oral and general healthcare are common risks of ill-health faced by them [5]. Due to their inaccessible living areas, lack of education, and limited capacity to avail benefits, they have further reduced their chance of good health [2,6].

The Koragas are indigenous to Dakshina Kannada, Udupi, Karnataka, and Kasaragod, Kerala, in South India. The places where they reside in Karnataka are usually called 'Tulu naadu' [7]. According to the 2001 census of India, the total Koraga population of the nation is 16,071, which has increased to 16,376 in the 2011 census [8]. Their language is Koraga, which has no script, and they speak Kannada, Tulu, and Malayalam according to the places they live [9].

The diet of the Koraga mainly consists of rice and meats such as beef and pork, along with pulses and vegetables [7]. Their main occupation is basket making and food gathering [9]. They medical and dental healthcare facilities. Diseases such as asthma, tuberculosis, skin conditions, malaria, and visual disabilities are common in this community [10]. Women and children also suffer from malnutrition and chronic diseases such as anaemia [10].

Initially, the Koragas were inhabitants of Dakshin Karnataka. The Koragas migrated to Kerala when Kasargod district, which was part of Karnataka, was added to Kerala. As commercialisation increased, they became 'outsiders' and were alienated in the land they had inhabited for centuries [10].

The Malavettuvan tribes are scheduled tribes seen only in the Kasaragod District of Kerala, especially in the ghat areas. They are commonly called 'Vettuvans' and speak Malayalam and Tulu. They cultivate herbal plants used for treating ailments of the kidney, urinary bladder, skin-related diseases, etc., [11].

Physical distances and geographic barriers have imposed impediments to human interaction and have led to endogamous

(i.e., within-group) mating patterns resulting in genetic substructure [12]. An understanding of the unique patterns of genes across patient populations defined by race helps in identifying populations at risk of developing particular diseases. It enables better treatment planning and preventive measures to tackle those diseases [13,14]. Differences in socio-economic status also account for the health inequalities between indigenous and non-indigenous groups.

Several studies on tribal communities have reported a lack of education, economic progress, or healthy lifestyles, as well as limited access to medical or dental care, resulting in a high prevalence of oral diseases [15-17]. Additionally, alcohol abuse, tobacco use, stress, and social hierarchy affect overall health. Except for a study by Dey MS et al., describing the periodontal status of the Koraga tribe, none have been published to date [15]. Furthermore, literature describing the periodontal health or oral health status of Malavettuvan tribes is lacking. Hence, the present study was planned to determine the periodontal health status in these two different ethnic groups of Kasargod district, Kerala, which would provide details for a better understanding of the pathogenesis of periodontal diseases in these populations.

MATERIALS AND METHODS

This cross-sectional study was conducted in the tribal colonies of the Koraga and Malavettuvan tribes in Badiaduka and Panathadi panchayats of Kasargod district, Kerala, India systematically scheduled from November 2017 to May 2020. The list of tribal colonies in Kasargod district was obtained from the District Tribal Development Office, Kasargod, Kerala. The Institutional Review Board of a private dental college issued ethical clearance (SD/SMG/2017/648) and permitted the study to be conducted. Informed consent, verbally and in written form, was obtained from participants after a detailed discussion about the purpose of the study.

Inclusion criteria: Individuals belonging to the Koraga and Malavettuvan tribes, aged 35-55 years, residing in the rural areas of Kasargod district, Kerala were included in the study after giving informed consent.

Exclusion criteria: Bedridden patients, infants, and children, people residing in the same geographic area but not belonging to the Koraga and Malavettuvan tribes and those who had systemic diseases were excluded from the study.

Sample size estimation: A pilot study was conducted in the Badiadka panchayat of Kasaragod district on 30 subjects from both tribes to determine the sample size and the feasibility of the study. A sample size of 304 was required, with an expected prevalence of 60% in one group and 50% in the other, with a power of 80% and an alpha error of 10%.

Questionnaire: A modified and content-validated questionnaire based on the World Health Organisation (WHO) Oral Health Assessment Form for Adults, 2013, was used to assess the socio-demographic characteristics, habits, and oral health beliefs [18]. The questionnaire included a total of 11 questions about the presence of pain, oral health practices, frequency of dental visits, dietary habits, tobacco use, alcohol consumption, and education. The validity and reliability score of the questionnaire was 0.85. Intraoral examinations were conducted using a mouth mirror and CPITN probe in a wooden chair under adequate natural light by a single examiner, with the findings recorded by a trained assistant.

Baseline data of all the patients were collected, including:

1. Socio-demographic data consisting of information on age, sex, geographic location, and occupation.
2. Oral hygiene practices, including brushing technique and material used.
3. Any associated deleterious habits.
4. Previous exposure to dental treatment.
5. Clinical parameters recorded were:
   - Oral Hygiene Index (Simplified)- John C Greene and Jack R Vermillion 1964 [19].
   - Community Periodontal Index (CPI)- Joint Working Committee of WHO 1982 [20].
   - Loss of attachment using the cementoenamel junction as a reference point using the CPITN probe [18].

STATISTICAL ANALYSIS

The recorded data was evaluated and analyzed using the Statistical Package for the Social Sciences (SPSS) software version 15.0. The Kolmogorov-Smirnov and Shapiro-Wilk tests were used to test for normality. As the majority of variables were not following a normal distribution, the Nonparametric Mann-Whitney U-test was applied to compare the clinical parameters. The Chi-square test was used for intragroup comparison.

RESULTS

The total study population was 608, with 304 subjects in each tribal group. The participants in the Malavettuvan and Koraga groups had mean ages of 42.52±15.77 and 41.82±14.69 years, respectively. Among the Koragas, there were 140 men and 164 women, while in the Malavettuvan group there were 148 men and 156 women.

The median OHI scores for the Malavettuvan (1.20±0.833) and Koraga (0.40±0.559) groups differed significantly, which was statistically significant (p<0.001). The median CPI values for the Koraga Group were 0.60±1.954, while those of the Malavettuvan group were 1.50±1.885 (p<0.001) [Table/Fig-1].

According to the questionnaire, the Koraga group reported more pain and discomfort (n=125, 41.11%) than the Malavettuvan group (n=117, 38.48%) (p=0.56) [Table/Fig-2]. Among the Koragas, 86.51% (n=263) brushed their teeth once daily, while in the Malavettuvan group, it was 80.92% (n=246) [Table/Fig-2]. In the Koraga group, 70.06% (n=213) used toothbrush and toothpaste, and 29.93% (n=91) used charcoal as an oral hygiene aid. However, in the Malavettuvan group, 78.28% (n=238) used toothbrushes and toothpaste, and 21.71% (n=66) used charcoal [Table/Fig-2]. Among the Koraga participants, 39.80% (n=121) visited the dental clinic within a 6-month interval, while 37.82% (n=115) of Malavettuvan tribes visited the dental clinic within the same interval [Table/Fig-2].

	Group	Mean	SD	Minimum	Maximum	Quartiles				U-value	z-value	p-value
						Q1	Median	Q3	IQR			
OHI	Koraga	0.628	0.559	0.00	2.30	0.20	0.40	0.92	0.72	2624.00	-5.813	**<0.001***
	Malavettu va	1.279	0.833	0.10	3.20	0.50	1.20	1.78	1.28			
CPI	Koraga	1.027	1.954	0.00	17.00	0.00	0.60	1.50	1.50	3268.00	-4.249	**<0.001***
	Malavettu Va	1.491	1.885	0.00	17.00	0.60	1.50	1.80	1.20			
CAL	Koraga	1.278	1.799	0.00	17.00	0.00	1.50	1.80	1.80	4995.50	-0.011	0.991
	Malavettu Va	1.133	0.811	0.00	2.30	0.025	1.40	1.80	1.775			

[Table/Fig-1]: Comparison between Oral hygiene index, Community Periodontal Index (CPI) and Clinical attachment loss between Koraga and Malavettuvan tribes.
OHI: Oral hygiene index; CPI: Community Periodontal index; CAL: Clinical attachment loss

Comparative analysis of questionnaire responses		KORAGA		MALAVETT UVAN		Total		p-value
		Frequency	%	Frequency	%	Frequency	%	
Pain/ discomfort	Yes	125	41.11%	117	38.48%	242	39.80%	0.56
	No	179	58.88 %	187	61.51%	364	59.86%	
Duration of cleaning	Once a day	263	86.51%	246	80.92%	509	83.71%	**0.047**
	Twice or more a day	41	13.48%	58	19.07%	99	16.28%	
Materials used	Brush	213	70.06%	238	78.28%	451	74.17%	0.069
	Charcoal	91	29.93%	66	21.71%	157	25.82%	
Use toothpaste to clean your teeth		213	70.06%	238	78.28%	451	74.17%	
Dental visit	6-12 months	121	39.80%	115	37.82%	236	38.81%	
	>1 year, <2 year	99	32.56%	142	46.71%	241	39.63%	
	5 years or more	84	27.63%	47	15.46%	131	21.45%	
Reason for dental visit	Consultation/ advise	21	52.5%	19	47.5%	40	100.0%	**0.001**
	Pain with teeth, gum or mouth	125	51.7%	117	48.3%	242	100.0%	
	Treatment/ Follow-up treatment	32	28.1%	82	71.9%	114	100.0%	
	Routine check-up/ treatment	23	35.4%	42	64.6%	65	100.0%	
	Don't know/ Don't remember	103	70.1%	44	29.9%	147	100.0%	
Tobacco use	Cigarettes/ beedi	128	42.10%	155	50.98%	283	46.1%	**0.022**
	Chewing tobacco	110	36.18%	90	29.60%	200	32.6%	
	Other/Betel nut chewing	76	24.2%	55	18.3%	131	21.3%	
Alcoholic consumption (Drinks per day)	<1 drink	86	28.28%	52	17.10%	138	22.69%	**0.014**
	3 drinks	99	32.56%	96	31.57%	195	32.07%	
	>5 drinks	45	14.80%	20	6.57%	65	10.69%	
	Didn't drink for past 30 days	74	24.34%	136	44.73	210	34.53%	
Education	No formal schooling	125	41.11%	113	37.17%	238	39.14%	0.48
	Primary school completed	100	32.89%	122	40.13%	222	36.51%	
	Secondary School completed	45	14.80%	37	12.17%	82	13.48%	
	College	34	11.18%	32	10.52	66	10.85%	

[Table/Fig-2]: Comparison of questions in the questionnaire between Koraga and Malavettuvan groups.

Betel nut use (n=76, 24.2%) and gutka use (n=110, 36.8%) were more prevalent among the Koragas than among the Malavettuvans (18.3%, n=55) and (29.60%, n=90), while cigarette use was more common among the Malavettuvans (n=155, 50.98%) [Table/Fig-2]. Rice, vegetables, and cassava are more commonly consumed by Koragas, while rice, vegetables, and fruits are more commonly consumed by Malavettuvans [Table/Fig-3]. Consumption of alcohol was higher among the Koragas (n=230, 75.65%) compared to the Malavettuvan group (n=168, 55.26%) [Table/Fig-2]. Primary education was not received by 41.11% (n=124) of Koragas and 37.17% of Malavettuvans (n=113) [Table/Fig-2].

DISCUSSION

The present study conducted among the Koraga tribe and Malavettuvan tribe of Kasargod district showed a lower prevalence of periodontal diseases. A similar study conducted by Dey MS et al., among Koraga tribes in Mangalore Taluk concluded that Koraga tribes have a higher prevalence of gingival and periodontal diseases. It was evident from their study that Koragas are living a difficult life, have poor oral hygiene, and are deprived of awareness and access to treatment facilities [15].

The mean OHI-S index values for Koraga and Malavettuvans indicated fair oral hygiene status, but when compared between the two groups, the oral hygiene index of the Malavettuvan tribes showed a higher score. The present findings are in accordance with similar studies conducted on other communities such as the Koya and Lambada groups of Telangana, Australian aborigines, and residents of Kolar district [21-23]. The high mean values of the oral hygiene index and its components suggest a widespread and uniform neglect of tooth cleaning/brushing habits among tribal groups. The relatively fair oral hygiene among the Koraga tribes may be due to their habit of gargling their mouth and a majority of them brushing their teeth with toothpaste and a toothbrush, indicating a change in attitude towards oral hygiene.

The CPI was used to determine the prevalence of periodontal disease among both tribes. The prevalence of periodontal disease was lower among both tribes. This is in accordance with a study conducted by Bharathesh JV and Reddy CVK, on the Todas, aboriginals of the Nilgiri Hills in South India [24]. The Malavettuvan tribes showed a significantly higher prevalence of periodontal disease compared to the Koragas. The average number of sextants with bleeding on probing was significantly lower in the Koraga and Malavettuvan groups. Similar findings were observed by Jordan RA et al., in rural African Gambia [25].

The prevalence of loss of attachment was lower in both tribes, and there was no significant difference between the two tribes. This can be compared with a study conducted by Bagramian RA et al., among the Amish native people, where he observed low levels of periodontal diseases among the Amish, even though they did not seek regular dental care [26]. This may be attributed to the fact that people belonging to these tribes consume large amounts of vegetables, tubers, and roots, which may have a self-cleansing effect on the teeth. Diet also plays a role in maintaining their oral hygiene, as the diet of Koraga tribes includes highly fibrous foods rather than refined carbohydrates, as observed during the study.

In the Koraga and Malavettuvan tribal populations, the majority of individuals cleaned their teeth using a combination of toothbrush and toothpaste. Khadir RA et al., who conducted a study on aborigines of Selangor, West Malaysia, reported that the majority of the population used a toothbrush with toothpaste and brushed their

Comparative analysis of diet			Group		Total	p-value
			KORAGA	MALAVET-TUVAN		
Fresh fruit	Every day	Frequency	54	143	197	0.001
		%	27.4%	72.6%	100.0%	
	Several times a week	Frequency	79	106	185	
		%	42.7%	57.3%	100.0%	
	Once a week	Frequency	75	40	115	
		%	65.2%	34.8%	100.0%	
	Several times a month	Frequency	38	15	53	
		%	71.7%	28.3%	100.0%	
	Seldom	Frequency	58	0	58	
		%	100.0%	0.0%	100.0%	
Sweets	Several times a week	Frequency	0	6	6	0.001
		%	0.0%	100.0%	100.0%	
	Once a week	Frequency	4	123	127	
		%	3.1%	96.9%	100.0%	
	Several times a month	Frequency	112	149	261	
		%	42.9%	57.1%	100.0%	
	Seldom	Frequency	178	24	202	
		%	88.1%	11.9%	100.0%	
	Never	Frequency	10	2	12	
		%	83.3%	16.7%	100.0%	
Tea with sugar	Every day	Frequency	277	194	471	0.001
		%	58.8%	41.2%	100.0%	
	Several times a week	Frequency	0	37	37	
		%	0.0%	100.0%	100.0%	
	Seldom	Frequency	11	30	41	
		%	26.8%	73.2%	100.0%	
	Never	Frequency	16	43	59	
		%	27.1%	72.9%	100.0%	
Coffee with sugar	Every day	Frequency	27	46	73	0.001
		%	37.0%	63.0%	100.0%	
	Several times a week	Frequency	0	26	26	
		%	0.0%	100.0%	100.0%	
	Several times a month	Frequency	20	0	20	
		%	100.0%	0.0%	100.0%	
	Seldom	Frequency	194	101	295	
		%	65.8%	34.2%	100.0%	
	Never	Frequency	63	131	194	
		%	32.5%	67.5%	100.0%	
Rice	Every day	Frequency	304	304	608	
		%	50.0%	50.0%	100.0%	
Vegetables	Every day	Frequency	288	294	582	0.001
		%	49.5%	50.5%	100.0%	
	Several times a week	Frequency	0	10	10	
		%	0.0%	100.0%	100.0%	
	Seldom	Frequency	16	0	16	
		%	100.0%	0.0%	100.0%	
Casava	Several times a week	Frequency	65	42	107	0.001
		%	60.7%	39.3%	100.0%	
	Once a week	Frequency	193	112	305	
		%	63.3%	36.7%	100.0%	
	Several times a month	Frequency	46	134	180	
		%	25.6%	74.4%	100.0%	
	Seldom	Frequency	0	10	10	
		%	0.0%	100.0%	100.0%	
	Never	Frequency	0	6	6	
		%	0.0%	100.0%	100.0%	
Total		Frequency	304	304	608	
		%	50.0%	50.0%	100	

[Table/Fig-3]: Comparison of diet in the questionnaire between Koraga and Malavettuvan groups.

S. No.	Author's name and year	Place of study	Number of subjects	Population studied	Parameters compared	Conclusion
1	Gopalankutty N et al., [16]	Attapady, Palakad district, Kerala, India	360	Irulas Mudugas Kurumbas	Oral hygiene habits risk factors oral mucosal lesions oral health beliefs CPI modified index prevelence of periodontal disease	Prevalence of periodontal disease and periodontitis were high among tribal population of Attapady.
2	Anjali S et al., [17]	Nilambur, Kerala, India	684	Cholanaicken Kattunaicken	Periodontal status Dental caries Dental trauma Treatment needs Dentofacial anomalies Loss of attachment Dental fluorosis Oral mucosal location Extra oral condition	Oral health status of tribal population was poor due to dental caries and periodontal diseases. It was observed that there was lack of awareness about oral health, lack of previous dental care, and limited access to oral health services.
3	Pradeep SP et al., [29]	Wayanad, Kerala, India	1000	Kurichiya Paniya	Community Periodontal Index (CPI) Loss of attachment	There are disparities in periodontal health status among the privileged and the underprivileged tribes of Wayanad.
4	Dey MS et al., [15]	Mangalore, Karnataka, India	400	Koraga	Tobacco use Oral hygiene Index CPI Loss of attachment Oral hygiene practice	Koragas has poor oral hygiene and periodontal status because they are deprived of the awareness, low socio economic status and availability of treatment facilities.
5	Mallya SD et al., [30]	Udupi, Karnataka, India	273	Koraga	-	Malnutrition was prevalent among Koraga adults and children, which warrants designing and implementing appropriate social and health interventions in this population.

6	Present Study	Kasargod, Kerala, India	608	Koraga Malavettuvan	Oral hygiene Index Community Periodontal Index Clinical attachment loss Tobacco use Oral hygiene practices Diet Alcohol	Koragas and Malavettuvans had a very primitive life styles with less formal education, there was lesser level of periodontal disease observed among both groups

[Table/Fig-4]: Comparative summary of similar studies done on different tribal populations [15-17,29,30].

teeth once daily, which was also observed in the present study [27]. Conversely, Bhat PK and Sushi K, reported that chew sticks (79.8%) were more commonly used than toothbrushes in Iruliga tribes in Karnataka [28]. The authors suggested that participants typically provide socially acceptable answers to queries about dental health and dental health behaviour [28]. Several epidemiological studies have been conducted across the country among tribal groups to assess periodontal health [Table/Fig-4] [15-17,29,30].

The Koragas mainly used tobacco in smokeless forms (gutka-36.18%, betel nut-24.2%) compared to the Malavettuvans (gutka-29.60%, betel nut-18.3%). This is consistent with the study conducted by Dey MS et al., in Koragas of Mangalore Taluk, where 34% of them had the habit of betel nut chewing [15]. It was observed that they always carry a small pouch containing betel leaves and areca nut powder. Due to continuous betel nut chewing, the majority of them had generalised attrition, and many (38-42%) experienced pain and sensitivity. Cigarette smoking was found to be more prevalent among the Malavettuvans (50.98%) compared to the Koragas (42.10%). They believe that smoking and smokeless tobacco provide relief from the heavy labor they perform. This behaviour may also be associated with their illiteracy and lack of awareness regarding the harmful effects of these habits.

Education and motivation of the population are required to improve oral hygiene, implement oral hygiene measures, and discourage habits like smoking, smokeless tobacco use, and alcohol consumption.

Limitation(s)

Given the higher usage of tobacco among the tribes, additional parameters such as oral and mucosal lesions, dental stains, and dental caries could have been considered. There is a possibility that participants in the study may have provided socially acceptable answers to questions about dental health and behaviour. More interventional designs should be considered in tribal communities to enhance their oral health.

CONCLUSION(S)

Within the limitations of the study, it can be concluded that although the oral hygiene measures of both tribes were inadequate, they still exhibit a lower prevalence of periodontal destruction. The Koraga tribe showed better oral hygiene and less periodontal destruction than the Malavettuvan tribes, partly due to accessibility to oral health care, education, and government-implemented programs. The role of diet, which includes rich fibers rather than refined sugars, their habit of frequent mouth gargling, genetic constitution, immunity, and other protective factors, may have influenced the prevalence of disease and deserve mention. Therefore, more community health care programs emphasising the importance of oral health among these tribal populations should be implemented.

REFERENCES

[1] Census of scheduled caste and scheduled tribes. Available from: https://censusindia.gov.in/census.website/data/census-tables.
[2] Mohindra KS, Labonté R. A systematic review of population health interventions and scheduled tribes in India. BMC Public Health. 2010;10(1):438.
[3] Narang P, Tyagi NK, Mendiratta DK, Jajoo UN, Bharambhe MS, Nayar S. Prevalence of sputum-positive pulmonary tuberculosis in tribal and non-tribal populations of the Ashti and Karanjatahsils in Wardha district, Maharashtra State, India. Int J Tubercu Lung Dis. 1999,3(6):478-82.
[4] Ghosh R, Bharati P. Haemoglobin status of adult women of two ethnic groups living in a peri-urban area of a Kolkata city, India: A micro-level study. Asia Pacific J Clin Nutr. 2003;12(4):451-59.
[5] Subramanian SV, Smith GD, Subramanyam M. Indigenous Health and Socioeconomic Status in India. PLoS Medicine. 2006;3(10):e421.
[6] Mohindra KS, Narayana D, Haddad S. 'My story is like a goat tied to a hook'. Views from a marginalised tribal group in Kerala (India) on the consequences of falling ill: A participatory poverty and health assessment. J Epidemiol Community Health. 2010;64(6):488-94.
[7] Patel HM, Maralusiddaiah, Srinivas BM, Vijayendra BR. Primitive tribes in contemporary India: Concept ethnography, demography. Edition new. Mittal: New Delhi; 2005;120-21.
[8] Census of India 2011. Available from: https://censusindia.gov.in/census.website/.
[9] Report on the socio economic status (RSES). (2013): Scheduled tribe's development department government of Kerala. Available from: https://www.stdd.kerala.gov.in/sites/default/files/inline-files/surveyd_2008.pdf.
[10] Nalinam M. Depopulation of Koraga tribes in south India. IOSR Int J Human Soc. 2013;8(4):01-05.
[11] Thomas PV, Jose J, Thomas TB. An Introductory Ethnobotanical Investigations on Zingiberales used Malavettuvan and Mavilan Tribes of Kasargod District of Kerala. Int J Adv Res. 2017;5(6):228-34.
[12] Burchard EG, Ziv E, Coyle N, Gomez SL, Tang H, Karter AJ, et al. The importance of race and ethnic background in biomedical research and clinical practice. New Engl J Med. 2003;348(12):1170-75.
[13] Badzek L, Henaghan M, Turner M, Monsen R. Ethical, legal, and social issues in the translation of genomics into health care. J Nurs Scholarsh. 2013;45(1):15-24.
[14] Fine MJ, Ibrahim SA, Thomas SB. The role of race and genetics in health disparities research. Am J Public Health. 2005;95(12):2125-28.
[15] Dey MS, Nagaratna VD, Mathew J. Assessment of periodontal health status among Koraga tribes residing in Manglore Taluk: A cross sectional study. Int J Res Med Sci. 2017;5(9):3980-84.
[16] Gopalankutty N, Vadakkekuttical RJ, Remadevi S, Pillai AS. Prevalence of periodontitis and its correlates among tribal population of Attapady block, Palakkad District, Kerala. J Indian Soc Periodontol. 2020;24(3):264-70.
[17] Anjali S, Shivakumar M, Ranganath S, Santhakumari S. Assessment and comparison of tobacco dependence level among cholanaicken and kattunaicken tribal groups of nilambur forest, Kerala: A questionnaire study. J Indian Acad Dent Spec Res. 2017;4:42-45. Available from: https://www.jiadsr.org/images/book-pdf/2017/JIndianAcadDentSpecRes_2017_4_2_42_222187.pdf.
[18] World Health Organization. Oral health survey: Basic methods. 5th ed. Geneva: World Health Organization; 2013.
[19] Greene JC, Vermillion JR. The simplified oral hygiene index. J Am Dent Assoc. 1964;68(1):07-13.
[20] Ainamo J, Barmes D, Beagrie G, Cutress T, Martin J, Sardo-Infirri J. Development of the World Health Organization (WHO) community periodontal index of treatment needs (CPITN). Int Dent J. 1982;32(3):281-89.
[21] Asif SM, Naheeda S, Assiri KI, Almubarak HM, Kaleem SM, Zakirulla M, et al. Oral hygiene practice and periodontal status among two tribal population of Telangana state, India-an epidemiological study. BMC Oral Health. 2019;19(1):8.
[22] Schamschula RG, Cooper MH, Wright MC, Agus HM, Un PS. Oral health of adolescent and adult Australian Aborigines. Community Dent Oral Epidemiol. 1980;8(7):370-74.
[23] Megalamanegowdru J, Ankola AV, Vathar J, Vishwakarma P, Dhanappa KB, Balappanavar AY. Periodontal health status among permanent residents of low, optimum anhigh fluoride areas in Kolar District, India. Oral HIth Prev Dent. 2012;10(2):175-83.
[24] Bharateesh JV, Reddy CVK. Oral health status and treatment needs of Todas Aboriginals in Nilgiris (An Epidemiological study). J Indian Assoc Public Health Dent. 2011;9(17):38.
[25] Jordan RA, Lucaciu A, Fotouhi K, Markovic L, Gaengler P, Zimmer S. Pilot pathfinder survey of oral hygiene and periodontal conditions in the rural population of The Gambia (West Africa). Int J Dent Hygiene. 2011;9(1):53-59.
[26] Bagramian RA, Farghaly MM, Lopatin D, Sowers MF, Syed SA, Palmerville JL. Periodontal disease in an Amish population. J Clin Periodontal. 1993;20(4):269-72.
[27] Kadir RA, Yassin AT. Oral health beliefs, practice and attitudes towards dental health among the aborigines (Orang Asli) of Selangor, West Malaysia. Tropical Dent J. 1989;12:13-17.
[28] Bhat PK, Sushi K. Periodontal health status and oral hygiene practices of Iruliga tribal community residing at Ramanagar district, Karnataka, India. J Int Oral Health. 2010;2(1):17-26.
[29] Pradeep SP, Palliyal S, MA, Mangal A. Comparison of periodontal disease prevalence among the privileged and the underprivileged tribes of Wayanad, Kerala: A cross sectional study. Int J Oral Health Dent. 2020;6(1):22-26.
[30] Mallya SD, Shreedhar S, Sudhakaran D, Aravindhkumar B, Nair S, Shetty RS. Health status of Koraga community: A pilot study among a particularly vulnerable tribal group of Udupi District, Karnataka, India. Indian J Med Res. 2022;156(2):275.

PARTICULARS OF CONTRIBUTORS:
1. Senior Lecturer, Department of Periodontics, Asan Memorial Dental College and Hospital, Chengalpattu, Tamil Nadu, India.
2. Professor and Head, Department of Periodontics, Sharavathi Dental College and Hospital, Shimoga, Karnataka, India.
3. Professor, Department of Periodontics, Sharavathi Dental College and Hospital, Shimoga, Karnataka, India.
4. Professor, Department of Periodontics, Sharavathi Dental College and Hospital, Shimoga, Karnataka, India.
5. Senior Professor, Department of Periodontics, Sharavathi Dental College and Hospital, Shimoga, Karnataka, India.
6. Reader, Department of Periodontics, Sharavathi Dental College and Hospital, Shimoga, Karnataka, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Pooja Raghu,
No. 6, Ganesh Nagar, Madhavaram Milk Colony, Chennai-600051,
Tamil Nadu, India.
E-mail: pooja.raghu78@gmail.com

PLAGIARISM CHECKING METHODS: [Jain H et al.]
- Plagiarism X-checker: Jul 18, 2023
- Manual Googling: Feb 17, 2024
- iThenticate Software: Feb 20, 2024 (16%)

ETYMOLOGY: Author Origin

EMENDATIONS: 9

AUTHOR DECLARATION:
- Financial or Other Competing Interests: None
- Was Ethics Committee Approval obtained for this study? Yes
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. NA

Date of Submission: **Jul 18, 2023**
Date of Peer Review: **Sep 23, 2023**
Date of Acceptance: **Feb 22, 2024**
Date of Publishing: **May 01, 2024**

PROFORMA

Oral Health Questionnaire for Adults

Identification number:

Sex Male ☐ Female ☐

2. **Location** Urban ☐ Periurban ☐ Rural ☐
2. **How old are you today?** (Years)
3. **During the past 12 months, did your teeth or mouth cause any pain or discomfort?**

Yes..... ☐
No..... ☐
Don't know..... ☐
No answer..... ☐

4. **How often do you clean your teeth?**

Never..... ☐
Once a month..... ☐
2-3 times a month..... ☐
Once a week..... ☐
2-6 times a week..... ☐
Once a day..... ☐
Twice or more a day..... ☐

5. **Do you use any of the following to clean your teeth?**

	Yes	No
Toothbrush.....		
Wooden toothpicks.....	☐	
Plastic toothpicks?.....	☐	
Thread (dental floss).....	☐	
Charcoal.....	☐	
Chewstick/miswak.....	☐	
Other.....	☐	

	Yes	No
6. **Do you use toothpaste to clean your teeth**.....		

7. **How long is it since you last saw a dentist?**

Less than 6 months..... ☐

6-12 months..... ☐

More than 1 year but less than 2 years..... ☐

2 years or more but less than 5 years..... ☐

5 years or more..... ☐

Never received dental care..... ☐

8. **What was the reason of your last visit to the dentist?**

Consultation/advise..... ☐

Pain or trouble with teeth, gums or mouth..... ☐

Treatment/ follow-up treatment..... ☐

Routine check-up/treatment..... ☐

Don't know/don't remember..... ☐

9. **How often do you eat or drink any of the following foods, even in small quantities?**

	Every day	several times a week	once a week	several times a month	seldom	never
Fresh fruit.....						
Sweets ……						
Tea with sugar …….....						
Coffee with sugar ….....						
(Insert country specific item)						
Rice.....	☐	☐	☐	☐	☐	☐
Vegetables.....	☐	☐	☐	☐	☐	☐
Cassava.....	☐	☐	☐	☐	☐	☐

Specify any other.....

10. **How often do you use any of the following types of tobacco?**

Every

	Yes	No
Cigarettes/Beedi.....	☐	☐
Chewing tobacco (Gutka).....	☐	☐
Other/Beetelnut chewing.....	☐	☐

Please specify

11. **During the past 30 days, on the days you drank alcohol, how many drinks did you usually drink per day?**

Less than 1 drink..... ☐

1 drink..... ☐

2 drinks..... ☐

3 drinks..... ☐

4 drinks..... ☐

5 or more drinks..... ☐

Did not drink alcohol during the past 30 days..... ☐

12. **What level of education have you completed?**

No formal schooling..... ☐

Less than primary school..... ☐

Primary school completed..... ☐

Secondary school completed..... ☐

College/university completed..... ☐

Postgraduate degree..... ☐

That completes our questionnaire

Thank you very much for your cooperation!

Year Month Day Interviewer District Country